SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Preliminary Draft Staff Report
Proposed Amended Rule 1110.2 – Emissions from Gaseous- and Liquid-Fueled Engines

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The South Coast Air Quality Management District (SCAQMD) is the air pollution control agency for all of Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties. SCAQMD is responsible for controlling emissions primarily from non-vehicular sources of air pollution.

Rule 1110.2 regulates oxides of nitrogen (NOx), carbon monoxide (CO), and volatile organic compound (VOC) emissions from liquid and gas fueled internal combustion engines operating in the SCAQMD producing more than 50 rated brake horsepower (bhp). The rule was adopted in 1990 and last amended in 2012 to establish an effective date of January 1, 2016 for owners and operators of biogas engines to meet the emission limits that all other engines under this rule were required to meet in July 1, 2011. A Final Technology Assessment was also completed which outlined several technologies for biogas engine emission control along with costs.

Pursuant to the board resolution for the September 7, 2012 amendments to Rule 1110.2, SCAQMD staff has held several meetings with biogas engine stakeholders for updates on the status of both ongoing demonstration projects and the installation of controls. Most of the operators have committed to installing control equipment for biogas engines. However, some biogas engine control installations will take longer than expected and would reach full compliance after the current deadline of January 1, 2016.

EPA Region 9 brought to SCAQMD staff's attention the breakdown provisions in the July 9, 2010 amended version of Rule 1110.2, which was submitted for SIP approval in 2014. EPA believes that the breakdown provisions are inconsistent with national policy regarding excess emissions during breakdown conditions, and would prevent full approval of the rule.

The proposed amendments would:

- Establish an effective date of January 1, 2017 for all biogas engines.
- Provide additional time until January 1, 2018 for all biogas engines with the submittal of a compliance plan and payment of a compliance flexibility fee.
- Provide an alternate compliance option to give biogas owners or operators that commenced demonstration projects prior to January 1, 2015 additional time until January 1, 2018 without payment of a compliance flexibility fee, and to January 1, 2019 with payment of a compliance flexibility fee.
- Allow the assessment of the compliance flexibility fee on a quarterly basis.
- Address EPA's concerns with equipment breakdowns and potential excess emissions without enforcement by establishing a limit for exceedances due to breakdowns without enforcement action per calendar quarter.

The project would result in a delay of 0.9 tons per day of NOx reductions, 0.5 tons per day of VOC reductions, and 20 tons per day of CO reductions. The cost effectiveness for the installation of controls would remain unchanged from those presented in the 2012 Final Technology Assessment and Final Staff Report.

CHAPTER 1: BACKGROUND

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INTRODUCTION

The California Health and Safety Code requires the AQMD to adopt an Air Quality Management Plan (AQMP) to meet state and federal ambient air quality standards and adopt rules and regulations that carry out the objectives of the AQMP. The California Health and Safety Code also requires the AQMD to implement all feasible measures to reduce air pollution. The 2007 AQMP found that additional reductions are needed to meet the more stringent federal ozone and particulate matter standards. Reductions in NOx and VOC will aid in attaining the ozone standard in 2023. Figure 1 shows the projected baseline emissions for NOx and VOC and the required emissions to achieve the ozone standard in 2023. Further NOx and VOC reductions from Rule 1110.2 biogas engines are essential for achieving compliance with federal and state ambient air quality standards for PM2.5 and ozone.

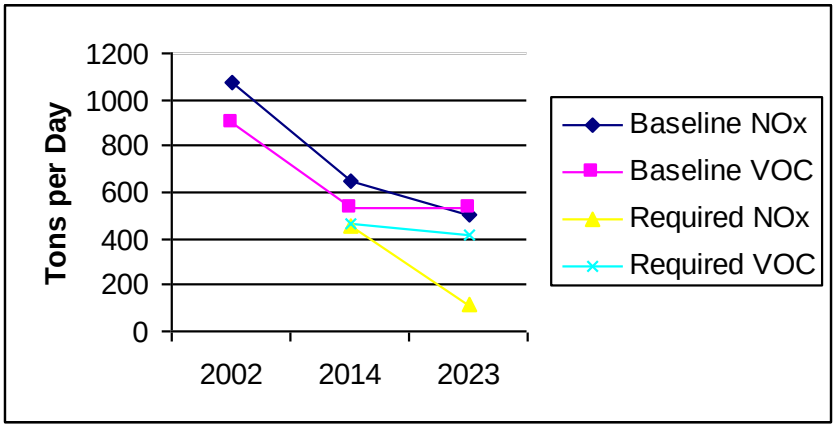

Figure 1. NOx and VOC Baseline Emissions and Emissions Needed to Achieve the 2023 Ozone Standard

Engines that are fueled by biogas (landfill or digester gas) make up about 7% of stationary, non-emergency engines in the AQMD. Of all the combustion sources, these engines inherently have the highest emissions. Rule 1110.2, "Emissions from Gaseous- and Liquid-Fueled Engines," was first adopted in 1990 to address emissions from stationary engines in this category. Since the rule's adoption, advances in low NOx burner and post combustion control technology have been demonstrated and implemented on several categories of combustion equipment. In contrast, the current NOx concentration BACT and rule limits for biogas engines are at least twelve times higher than allowed by AQMD boiler rules.

Projected NOx emissions reductions from biogas engines achieving the emissions limits set in the 2008 rule amendment were not included in the State Implementation Plan (SIP) because they were contingent on the completion of a Technology Assessment. The Final

Technology Assessment was completed as part of the amendments to Rule 1110.2 in 2012. Upon implementation, the NOx reductions from biogas engines will be incorporated into the SIP to further promote the District's efforts towards the attainment of federal and state $PM_{2.5}$ and ozone air quality standards.

REGULATORY HISTORY

Rule 1110.2 – Emissions from Gaseous- and Liquid-Fired Engines was adopted by the AQMD Governing Board on August 3, 1990. It required that either 1) NOx emissions be reduced over 90% to one of two compliance limits specified by the rule, or; 2) the engines be permanently removed from service or replaced with electric motors. It was amended in September 1990 to clarify rule language and then amended in August and December of 1994 to modify the CO monitoring requirements and to clarify rule language. The amendment of November 1997 eliminated the requirement for continuous monitoring of CO, reduced the source testing requirement from once every year to once every three years, and exempted non-road engines, including portable engines, from most requirements. The amendment in June 2005 made the previously exempt agricultural engines subject to the rule.

To address widespread non-compliance with stationary IC engines, the 2008 amendment augmented the source testing, continuous monitoring, inspection and maintenance (I&M), and reporting requirements of the rule to improve compliance. It also required stationary, non-emergency engines to meet emission standards equivalent to current BACT for NOx and VOC and almost to BACT for CO. This partially implemented the 2007 AQMP control measure for Facility Modernization (MCS-001). Additionally, the 2008 amendment required new electric generating engines to limit emissions to levels nearly equivalent to large central power plants, meeting standards that are at or near the CARB 2007 Distributed Generation Emissions Standards. It also clarified the status for portable engines and set emissions standards for biogas engines to become effective on July 1, 2012 if the July 2010 Technology Assessment would confirm the achievability of those limits.

The 2008 adopting resolution included commitments directing staff to conduct a Technology Assessment to address the availability, feasibility, cost-effectiveness, compliance schedule, and global warming gas impacts of biogas engine control technologies and report back to the Governing Board no later than July 2010. Additionally, the Governing Board directed that the July 2012 biogas emission limits would not be incorporated into the SIP unless the July 2010 Technology Assessment found that the proposed limits are achievable and cost-effective.

The amendment in July 2010 added an exemption to the rule affecting a remote public safety communications site at Santa Rosa Peak in Riverside County which has limited accessibility in the wintertime.

At the July 2010 Governing Board meeting, staff presented an Interim Technology Assessment to address the board resolution commitments in 2008. The Interim Technology Assessment summarized the biogas engine control technologies to date and the status of on-going demonstration projects. Due to the delays caused by the permit moratorium in 2009, the release of a subsequent report was recommended upon the completion of these projects. The Interim Technology Assessment concluded that feasible, cost-effective technology should be available that can support the feasibility of the July 2012 emission limits, but that the delay in the demonstration projects would likely necessitate an adjustment to the July 1, 2012 compliance date of Rule 1110.2.

The September 2012 amendments established a compliance date of January 1, 2016 for biogas engines. A compliance option was also provided so that operators requiring additional time would be given up to two years beyond the compliance date with the submittal of a compliance plan and payment of a compliance flexibility fee. In addition, SCAQMD staff presented an Assessment of Available Technology for Control of NOx, CO, and VOC Emissions from Biogas-Fueled Engines that detailed the different available technologies and demonstration projects for biogas engines, along with costs.

EXTENSION OF THE COMPLIANCE DATE FOR BIOGAS ENGINES

Since the amendments to Rule 1110.2 on September 7, 2012, SCAQMD staff has met with the stakeholders periodically, both in public forums and through individual meetings for updates on technology implementation. Based on feedback from these operators, some installations will take longer to install than expected and will reach full compliance after the current deadline of January 1, 2016. The range of implementation dates ranged from about mid-2016 to mid-2018.

On March 31, 2011, the Orange County Sanitation District (OCSD) completed a one year pilot study demonstration of biogas cleanup with oxidation catalyst and SCR. Since that time, the system has continued to meet the future limits of the rule and the operator is currently in the process of retrofitting the remaining engines at its two facilities with the same technology. However, since there is a total of seven engines requiring retrofits, the overall project completion date will be after January 1, 2016. Other operators have similar timelines and have expressed their concerns to SCAQMD staff about meeting the January 1, 2016 deadline.

Two biogas technology demonstration projects are continuing. One is the NOxTech system at Eastern Municipal Water District's Temecula plant. NOxTech utilizes selective non-catalytic reduction (SNCR) without the necessity for fuel gas pretreatment. Although some preliminary data has shown that the system is capable of reducing NOx from digester gas fueled engines down to 11 ppm, consistent performance is something that the facility is still fine tuning. Based on the results of further testing of this unit, the technology may also be installed at another facility that operates one digester gas engine.

The second technology demonstration project is the hydrogen assisted lean operation (HALO) with partial oxidation gas turbine (POGT) at the City of San Bernardino Municipal Water Department. This technology employs hydrogen enrichment of the digester gas than results in leaner operation of the engine which reduces NOx emissions. The project has been partially funded with money from the SCAQMD along with the state. The project was awarded to the Gas Technology Institute (GTI) for fabrication and installation. The fabrication and installation has experienced some setbacks which have resulted in delays of the delivery of essential components belonging to the new system. The City of San Bernardino is hoping to use the results of this demonstration project, which will be utilized for only one engine, to possibly retrofit the remaining engines at the facility, which amount to five in total. Given the setbacks and delays, the operators feel that they will have a difficult time implementing the technology by 2018.

Based on the feedback from the regulated facility operators, SCAQMD staff is proposing to extend the compliance deadline for biogas engines beyond January 1, 2017.

EPA'S RULING ON EXCESS EMISSIONS DUE TO BREAKDOWNS

According to EPA Region IX staff, the current Rule 1110.2 language suggests that sources might be protected from enforcement for even gross emission violations during preventable breakdowns. Under this assessment, the rule language is in contrast to national policy as described in EPA's recent supplemental notice of proposed rulemaking on excess emissions from startup, shutdown, and malfunction on 79 FR 55920 (9/17/2014). The subject rule language originated in the February 2, 2008 amendment. However, EPA Region IX's comments refer to the July 9, 2010 amendment. The inconsistency with the rule language with EPA national policy precludes their ability to fully approve the rule.

To resolve EPA's issue with potential gross emission violations during preventable breakdowns, corrective actions have been proposed in the context of changes to Rule 1110.2. Not resolving this issue will result in EPA not approving the 2010 amendment into the State Implementation Plan (SIP). If this disapproval is finalized, sanctions would be imposed unless the U.S. EPA approves subsequent SIP revisions that correct the rule deficiencies within 18 months of disapproval.

A final disapproval would also trigger the two-year clock for the Federal Implementation Plan (FIP) requirement. It should be noted that the submitted rule has been adopted by the SCAQMD, and U.S. EPA's final limited disapproval would not prevent the SCAQMD from enforcing it.

KEY ISSUES

From ongoing meetings with the affected stakeholders in the Biogas Technology Advisory Committee, staff has summarized key issues that have resulted from those discussions.

1. *The Need for Additional Time to Comply*. Most of the stakeholders notified SCAQMD staff that they would need more time beyond January 1, 2016. Particularly, operators of biogas engine demonstration projects have encountered delays and operational issues that would also necessitate additional time to resolve.
2. *Complying with EPA's Breakdown Provisions*. SCAQMD staff has received feedback from the regulated community that points to concerns with determining the difference between a breakdown event and an emission check that is in exceedance of the rule limits.

AFFECTED INDUSTRIES

Rule 1110.2 applies to stationary and portable reciprocating internal combustion engines (ICEs) over 50 brake horsepower (bhp). PAR 1110.2 also affects the subset of engines that are fueled with biogas, which are those that are operated by landfills and wastewater treatment plants. Biogas engines are typically lean-burn engines that operate similarly to lean-burn natural gas-fired engines with a higher level of exhaust oxygen.

Landfills produce gas that results from the breakdown of municipal solid waste. This gas is primarily composed of methane and carbon dioxide. The gas is collected in a series of wells that transports it via pipeline to the landfill gas fired engines. The collected landfill gas fires one or more biogas engines with or without supplementation of natural gas.

Wastewater treatment plants produce digester gas from the plant's digesters. A digester uses heat and bacteria in an oxygen-free (anaerobic) environment to break down sewage sludge. A by-product of this process is biogas that contains methane. This biogas also fires one or more biogas engines with or without supplementation of natural gas. An advantage with using ICEs at wastewater treatment plants is that these are combined heat and power (CHP) units. The waste heat created by the engine can be recovered and used to heat the plant's digesters, resulting in energy savings.

Whether coming from a landfill or an anaerobic digester, the biogas is used to fire an internal combustion engine with a generator to produce electricity. Some facilities are self-generating facilities that use the electricity to power their processes internally. Others sell this generated power to the local utility grid. The wastewater treatment plants are primarily operated by public entities and utilities, while the landfills are operated by either public or private operators. There are a total of eight public operators and five private operators for biogas engines in the South Coast Basin.

There are currently 58 biogas engines operating in the Basin. Of these engines, 30 are digester gas-fueled and 28 are landfill gas-fueled. These engines are operated by 13 independent operators at 22 locations (6 operate digester gas-fueled engines and 7 operate landfill gas-fueled engines).

Despite past efforts to reduce emissions, biogas-fueled engines remain the dirtiest in terms of mass per unit power produced in the Basin, even though they are fired with renewable fuel. Even at BACT, these engines pollute significantly more than large central generating stations on a pound per megawatt-hour basis (Figure 2). For biogas ICEs, the NOx emissions are over 25 times higher than those of central power plants, 119 times higher for VOC, and 75 times higher for CO.

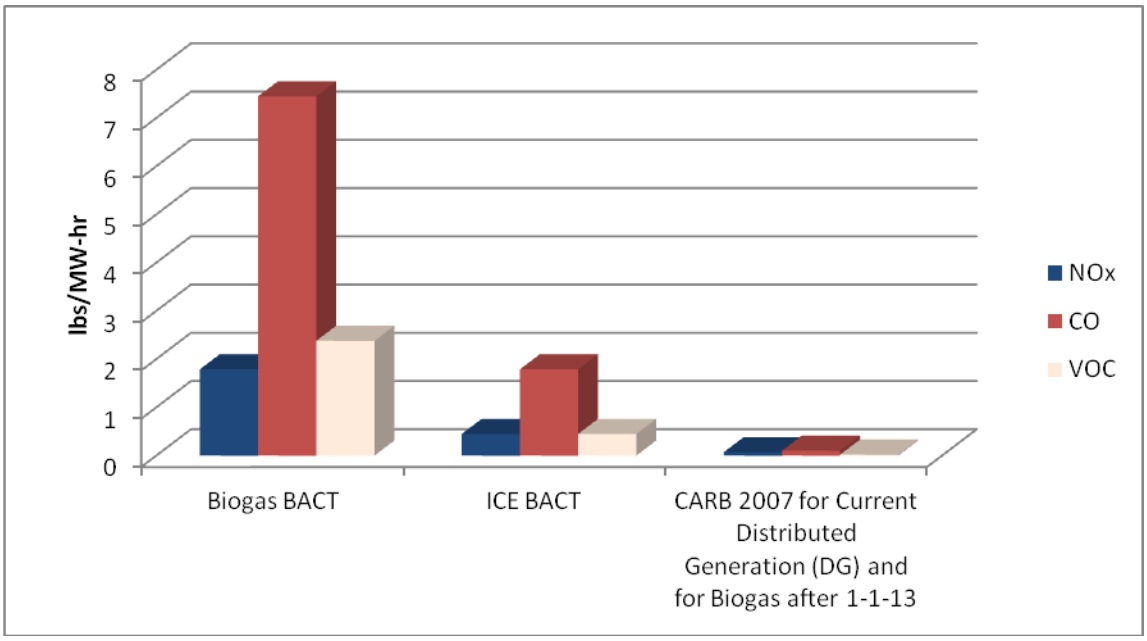

Figure 2. Current BACT for Biogas ICEs and Natural Gas ICEs vs. Central Generating Station BACT

During the 2010 Interim Technology Assessment, approximately 66 engines fueled by biogas were identified. Since that time, however, the number has decreased to 58 due to some engines being placed out of service. Nonetheless, the remaining biogas engines in operation are among the top NOx emitters amongst stationary, non-emergency engines.

For the proposed amendments pertaining to EPA's concerns over equipment breakdowns and excess emissions, these requirements would apply to all operators of gaseous- and liquid-fueled engines governed by this rule.

PUBLIC PROCESS

Since the 2008 amendment, staff has held numerous meetings of the Biogas Technology Advisory Committee with representatives from affected facilities, manufacturers, consultants and other interested parties. The Biogas Technology Advisory Committee was part of the ongoing commitment to finalize the Technology Assessment for biogas engines. Since the amendments in 2012, the Biogas Technology Advisory Committee has met on:

October 29, 2013,
May 28, 2014,
October 29, 2014,
January 14, 2015,
and February 19, 2015.

The Air and Waste Management Association (A&WMA) hosted a biogas workshop at the SCAQMD on May 16, 2013, where information on implementation technologies was presented. Additionally, the Stationary Source Committee was presented with updates on the implementation of the rule and demonstration projects as directed by the adopting resolution for the 2012 amendment, which required updates to the Stationary Source Committee at least yearly after the 2012 amendments. The Committee heard updates on Rule 1110.2 on:

June 21, 2013,
June 20, 2014,
and January 21, 2015.

SCAQMD's Technology Advancement Office also held two meetings on July 9, 2014 and January 14, 2015 to provide training on a biogas toolkit cost estimator for biogas cleanup projects. This was based on a nationwide survey of biogas control vendors and installations that was performed by a contractor that was awarded the project by SCAQMD.

A task force meeting was held on April 23, 2015 to introduce the proposed amendments and a working group meeting was held on July 9, 2015 where SCAQMD staff presented preliminary rule language for the proposed amendments.

Staff has also held several meetings with control equipment vendors and also manufacturers of emerging technologies that may provide an alternative to electrical power generation by traditional internal combustion methods. In addition, staff has met individually with nearly every biogas facility operator to discuss site-specific issues, technologies, long-term plans for existing biogas engines, and costs. Several site visits have been conducted by SCAQMD staff at affected facilities.

CHAPTER 2: SUMMARY OF PROPOSED RULE 1110.2

PROPOSED AMENDED RULE REQUIREMENTS

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The key proposed amendments can be summarized as follows:

- Extend the effective date for compliance to January 1, 2017 for all biogas engines.
- Extend the effective date for compliance to January 1, 2018 for demonstration project biogas engine operators.
- Provide an alternate compliance option to provide operators additional time for engine retrofits beyond the proposed compliance date with the submittal of a compliance plan and payment of a compliance flexibility fee.
    - Up to January 1, 2019 for demonstration projects
    - Up to January 1, 2018 for all other biogas engines
- The compliance flexibility fee would be allowed to be paid in quarterly increments, up to one year beyond the applicable compliance date.
- To address EPA's concerns on breakdowns and potential excess emissions without enforcement, staff is proposing that within any calendar quarter a facility operator would be allowed up to three incidences of NOx emissions between 20 and 45 ppmv per engine. For CO emissions, no more than three incidences per quarter would be allowed that are between 500 and 1000 ppmv.
- Diagnostic emission checks with NOx emissions between the limit of 11 and 20 ppmv would be subject to the current rule provisions for correcting and demonstrating compliance with 24 hours from the time the operator knew of the excess emissions. Diagnostic emission checks for CO emissions between the rule limit of 250 and 500 ppmv (or from the permit limit to 500 ppmv) would also be subject to the current rule provisions for correcting and demonstrating compliance within 24 hours from the time the operator knew of the excess emissions. Diagnostic emission checks beyond these limits as well as those conducted by SCAQMD that are beyond these limits would be subject to enforcement.

To provide the additional time needed for technology implementation, District staff is proposing to allow biogas engine operators more time for compliance with the emission limits adopted in the 2012 amendment. Subparagraph 1110.2(d)(1)(C) establishes the emission standards for biogas engines, specifies the effective dates for the emission limits, and provides the compliance schedule for all biogas engines, as listed in Table 3 on the next page. The table is split into two parts: The first part reflects the currently effective limits and the second part establishes the one year delay of the effective date limits for compliance.

Table 3. Proposed Concentration Limits for Biogas Engines

CONCENTRATION LIMITS FOR LANDFILL AND DIGESTER GAS (BIOGAS)-FIRED ENGINES		
NO_x (ppmvd)[1]	VOC (ppmvd)[2]	CO (ppmvd)[1]
bhp ≥ 500: 36 x ECF[3] bhp < 500: 45 x ECF[3]	Landfill Gas: 40 Digester Gas: 250 x ECF[3]	2000
CONCENTRATION LIMITS EFFECTIVE JANUARY 1, 2017		
NOx (ppmvd)[1]	VOC (ppmvd)[2]	CO (ppmvd)[1]
11	30	250

[1] Parts per million by volume, corrected to 15% oxygen on a dry basis and averaged over 15 minutes.

[2] Parts per million by volume, measured as carbon, corrected to 15% oxygen on a dry basis and averaged over the sampling time required by the test method.

[3] ECF is the efficiency correction factor.

For operators of biogas engine demonstration projects, the compliance date will be extended to January 1, 2018. A new subparagraph (d)(1)(F) will specify the operators referenced previously who are still undergoing demonstration projects.

> "For the City of San Bernardino and Eastern Municipal Water District that commenced and implemented technology demonstration projects prior to January 1, 2015, all their biogas engines shall have until January 1, 2018 to comply with the requirements of Table III-B."

The January 1, 2017 (non-demonstration project biogas engines) and January 1, 2018 (demonstration project biogas engines) compliance dates referenced above would involve no fee payment for the additional time.

An alternate compliance option is also proposed to provide biogas operators with additional time to comply beyond the compliance dates referenced in proposed Table III-B and subparagraph (d)(1)(F). The additional time would be provided with the submittal of a compliance plan and compliance flexibility fee. Subdivision (h) outlines the requirements for the plan submittal and the calculation of the compliance flexibility fee.

The fee will now be available to be paid in quarterly increments, up to one additional year. Some stakeholders felt that paying for an entire year of fees was excessive, especially if an engine would come into compliance earlier in the year. The fee would now be calculated based on the updated fee rate ($11.75/bhp per quarter) and multiplying by the rated brake horsepower of the unit and then multiplying by the number of quarters to defer (up to four quarters, or one year). The fees collected from this alternate compliance option will applied to AQMD NOx reduction programs. The proposed amendments will provide biogas engine facilities with additional time to implement the proper controls to meet the emission limits. For non-demonstration project biogas engines, additional time would be provided beyond the January 1, 2017 compliance date in Table III-B up to January 1, 2018 with payment of the fee. For demonstration project biogas engines designated in (d)(1)(F), additional time would be provided beyond the January 1, 2018 compliance date in (d)(1)(F) up to January 1, 2019 with payment of the fee.

To address the EPA issues relating to unenforced excess emissions from breakdowns, the provisions within the Inspection and Monitoring (I&M) Plan in subparagraph (f)(1)(D) will be amended. The I&M Plan requirements were established in the 2008 amendment to ensure non-CEMS engine compliance with the rule limits between source tests. It includes procedures for the monitoring of engine parameters and periodic testing of emissions with a portable analyzer, as well as recordkeeping requirements.

Clause (f)(1)(D)(v) lists the procedures for responding to, diagnosing, and correcting breakdowns, faults, malfunctions, alarms, emission checks finding emissions in excess of rule or permit limits, and parameters out-of-range. Emission checks performed with a portable analyzer will now be described as diagnostic emission checks. The staff proposal maintains the 24-hour time frame for an owner or operator who uses a portable analyzer as a diagnostic tool for monitoring purposes to correct an exceedance from when it is discovered [subclause (f)(1)(D)(v)(I)]. In addition to these requirements, exceedances within certain emission ranges are now proposed to avoid enforcement if timely corrected. In proposed subclause (f)(1)(D)(v)(II),

> "For a diagnostic emission check that detects NOx emissions (corrected to 15% O_2) greater than 11 ppmvd, but less than or equal to 20 ppmvd or CO emissions (corrected to 15% O_2) greater than 250 ppmvd, but less than or equal to 500 ppmvd (or from the permitted level up to 500 ppmvd), the operator shall not be considered in violation of this rule if the operator complies with the requirements of subclause (f)(1)(D)(v)(I). Any diagnostic emission check conducted by District staff that finds excess emissions will be treated as a violation"

If an operator is performing weekly or quarterly diagnostic emission checks with a portable analyzer and finds that the emissions are above the rule limits, but within the ranges specified above, the operator shall correct the problem and retest, or shut down the engine by the end of the operating cycle or 24 hours from the time the operator knew of

the exceedance. Additionally, the operator shall not be considered in violation of the emission limits if the problem is corrected and a subsequent diagnostic emission check demonstrates compliance.

However, for breakdowns resulting in emissions in excess of the rule or permit limits, the emissions often are of a more serious nature and the staff proposal aims to place a cap on the number of these excursions. EPA's concerns on excess emissions are based on the current rule allowing for correction of a breakdown without penalty and this situation could potentially occur repeatedly, resulting in much more excess emissions. The staff proposal will characterize breakdowns as a new definition in paragraph (c)(3):

> "BREAKDOWN is a failure or malfunction of equipment, air pollution control equipment, or related operating equipment that is not the result of operator error, neglect, improper operation or improper maintenance procedures, which leads to excess emissions beyond rule related emission limits or equipment permit conditions."

The emissions associated with these events will now be characterized under the following ranges listed in subclause (f)(1)(D)(v)(III):

> "For excess emissions due to breakdowns that result in NOx emissions (corrected to 15% O_2) greater than 20 ppmvd, but less than or equal to 45 ppmvd or CO emissions (corrected to 15% O_2) greater than 500 ppmvd, but less than or equal to 1000 ppmvd, the operator shall not be considered in violation of this rule if the operator demonstrates the following: (1) Compliance with subclause (f)(1)(D)(v)(I), (2) Compliance with the reporting requirements of subparagraph (f)(1)(H), and (3) The engine with excess emissions has no more than three incidences of breakdowns in the calendar quarter."

An operator with an engine that experiences a breakdown with resultant emissions in the ranges specified above must also comply with the requirements to correct the problem and demonstrate compliance with a subsequent diagnostic emission check, per subclause (f)(1)(D)(v)(I). In addition, the staff proposal would now require that these types of incidences be limited to no more than three in any calendar quarter.

For gross emissions as a result of breakdowns, these will be treated as violations and the specified ranges would be as stated in proposed subclause (f)(1)(D)(v)(IV):

> "Excess emissions resulting from breakdowns that exceed 45 ppmv of NOx and 1000 ppmv of CO, each corrected to 15% O_2, will be treated as a violation."

Further clarification of a breakdown is specified in paragraph (c)(3) in that any breakdown, no matter what the resultant excess emissions would be, that is caused by operator neglect, improper operation or improper maintenance procedures would be a

violation. All breakdowns, no matter what the cause, are still subject to the current reporting requirements of Rule 1110.2(f)(1)(H).

The requirements for parameters out of range that are currently in subclause (f)(1)(D)(v)(II) of the rule would now be moved to a new subclause (f)(1)(D)(v)(V). The subclause language would remain unchanged in the proposed rule, except for the addition of the term diagnostic emission check for clarification.

> "For other problems, such as parameters out-of-range, an operator shall correct the problem and demonstrate compliance with another diagnostic emission check within 48 hours of the operator first knowing of the problem."

Some minor clarifications were added to further specify the requirements of the I&M Plan for engines that operate with CEMS. An engine that operates both NOx and CO CEMS is not subject to the requirements of subparagraph (f)(1)(D), which contain the I&M Plan requirements. Operators with engines that have CEMS have the advantage of monitoring their emissions continuously and would be instantly alerted in the event that something goes wrong with the equipment. Any excess of the emission standard for these engines would be a violation under the current rule.

There are, however, engines that have a NOx CEMS but do not have a CO CEMS. For example, lean-burn engines typically have inherently lower CO emissions than their rich-burn counterparts and are not required to have a CO CEMS as stated in clause (f)(1)(A)(vii) of the current rule. Since these engines have a NOx CEMS, an I&M Plan as it pertains to NOx is not required. However, since these engines are subject to the quarterly CO monitoring requirements of (f)(1)(D)(iii)(II) in the current rule as part of the I&M Plan, clause (f)(1)(D)(xi) clarifies the applicability of these requirements for CO.

> "If an engine has a NOx CEMS and does not have a CO CEMS, it is not subject to this subparagraph (f)(1)(D) as it pertains to NOx only."

CHAPTER 3: IMPACT ASSESSMENT

EMISSIONS IMPACTS AND COST EFFECTIVENESS

The proposed amendments will have emissions impacts on biogas engines regulated by Rule 1110.2, but they would be delayed. Since biogas engines emit significantly more pollutants than natural gas engines and central power plants, the future emission standard will reduce NOx, VOC, and CO emissions drastically. On an aggregate pollutant basis, current biogas engine emissions are over 55 times higher than those of central power plants. The future emission standard will result in up to 74% emission reductions (Figure 3).

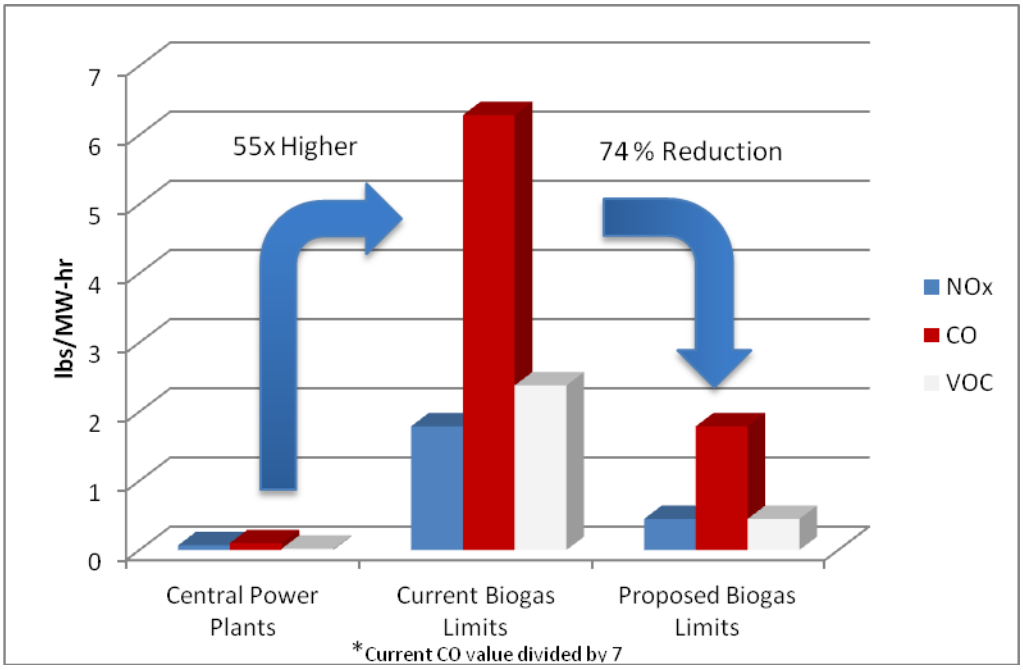

Figure 3. Emissions from Biogas ICEs versus Central Power Plants

The emission reductions calculated during the 2012 amendments were 0.9 tons per day of NOx, 0.5 tons per day of VOC, and 20.0 tons of CO. The reductions under the proposed amendment would occur in two steps. The first reductions will occur by January 1, 2017 and the second step of reductions will occur one to two years later when all biogas engines will comply with the rule limits, including those under the alternate compliance option.

During the 2012 amendment, the cost effectiveness for biogas engines was estimated to range from $1,700 to $3,500 per ton of NOx, VOC, and CO/7 reduced. Staff also calculated cost effectiveness to account for additional gas cleanup and associated contingencies, based on stakeholder feedback. Using vendor quotes for gas cleanup systems, two additional cost effectiveness curves were created reflecting the additional gas cleanup and an added 20% capital cost contingency. The upper cost effectiveness curve has a range from $2,600 to $5,900 per ton. The upper and lower (base level)

curves create a band that accounts for equipment contingencies. The cost effectiveness ranges are illustrated in Figure 4 for digester gas engines and Figure 5 for landfill gas engines.

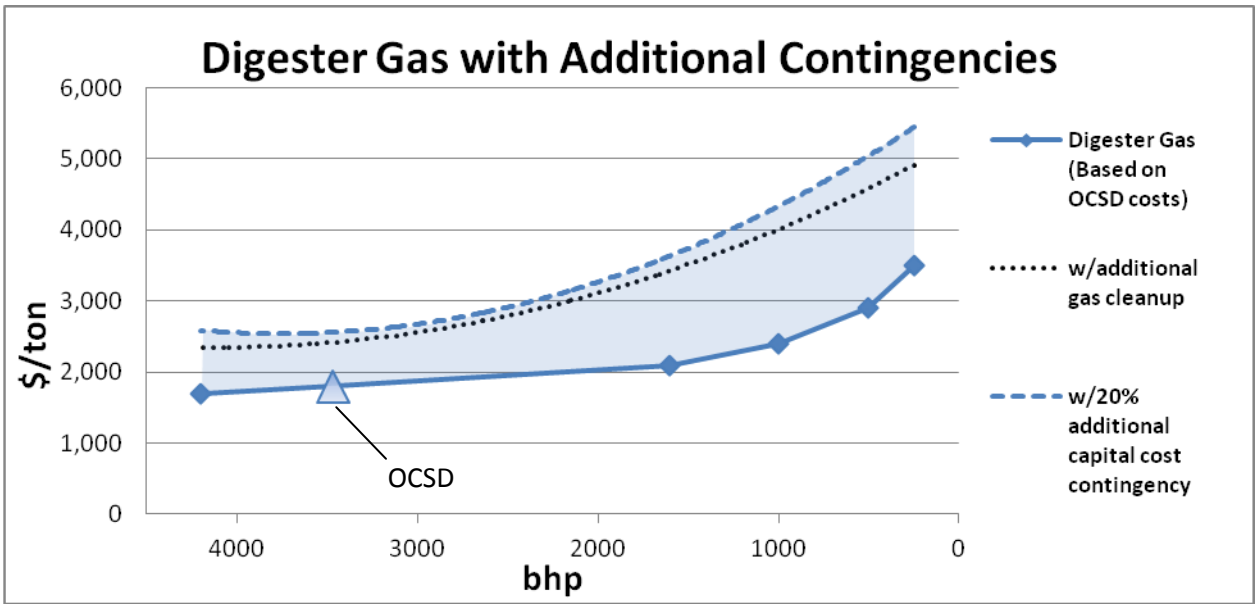

Figure 4. Cost Effectiveness for Digester Gas (Catalytic Aftertreatment)

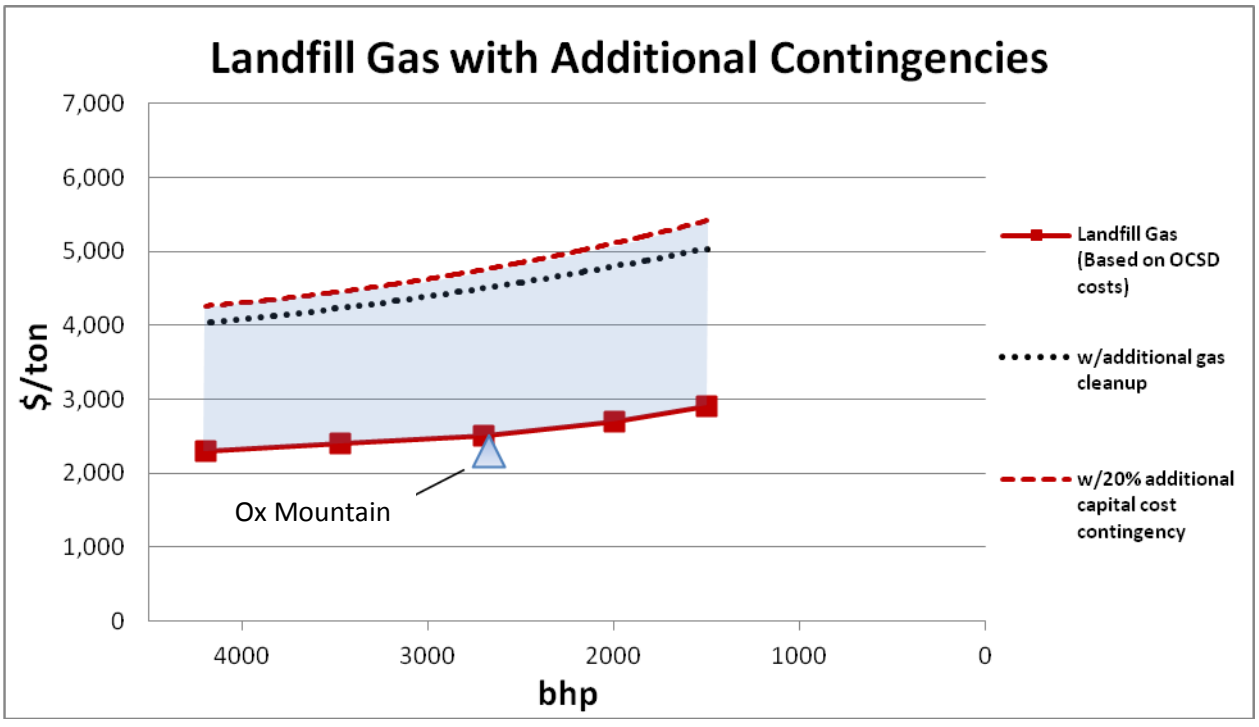

Figure 5. Cost Effectiveness for Landfill Gas (Catalytic Aftertreatment)

Digester gas and landfill gas engines of all sizes were shown to be cost-effective in 2012. The proposed amendments pertaining to EPA's policy on excess emissions from breakdowns will not require the modification or addition of control equipment and will not have an effect on costs.

INCREMENTAL COST-EFFECTIVENESS

Health and Safety Code Section 40920.6 requires an incremental cost-effectiveness analysis for Best Available Retrofit Control Technology (BARCT) rules or emission reduction strategies when there is more than one control option that would achieve the emission reduction objective of the proposed amendments, relative to ozone, CO, SOx, NOx, and their precursors. The proposed amendment does not include new BARCT requirements; therefore, this provision does not apply to the proposed amendment.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ANALYSIS

Pursuant to the California Environmental Quality Act (CEQA) and AQMD Rule 110, SCAQMD staff has reviewed PAR 1110.2 to identify the appropriate CEQA document for evaluating potential adverse environmental impacts. Although the proposed project consists of changes to a previously approved project evaluated in a certified CEQA document, by delaying the compliance date for biogas engines, the project would result in a delay of 0.9 tons per day of NOx reductions, 0.5 tons per day of VOC reductions, and 20 tons per day of CO reductions, which would be a new undisclosed impact not previously analyzed. Therefore, staff has concluded that a Subsequent Environmental Assessment is the appropriate CEQA document for the proposed project. Staff has released a Notice of Preparation and Initial Study for a 30-day public review period from July 29, 2015 to August 27, 2015. A CEQA scoping meeting has been scheduled for Thursday, August 13, 2015 at 10 AM in Conference Room GB at SCAQMD Headquarters.

SOCIOECONOMIC ASSESSMENT

PAR 1110.2 would delay implementation of new concentration limits for biogas-fired engines at affected facilities from 2016 to between 2017 and 2019. In addition, PAR 1110.2 would affect fewer biogas-fired engines. The additional time for compliance and fewer affected engines would result in potential savings for affected facilities. As such, no adverse socioeconomic impact is anticipated for PAR 1110.2.

DRAFT FINDINGS UNDER CALIFORNIA HEALTH & SAFETY CODE SECTION 40727

California Health and Safety Code Section 40727 requires that prior to adopting, amending or repealing a rule or regulation, the AQMD Governing Board shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the public hearing and in the staff report. In order to determine compliance with Sections 40727 and 40727.2 a written analysis is required comparing the proposed rule with existing regulations.

The draft findings are as follows:

Necessity: PAR 1110.2 is necessary to reduce emission limits from combustion equipment in order to meet federal and state ambient air quality standards for ozone and PM 2.5.

Authority: The AQMD obtains its authority to adopt, amend, or repeal rules and regulations from California Health and Safety Code Sections 39002, 40000, 40001, 40440, 40702, 40725 through 40728, and 41508.

Clarity: PAR 1110.2 has been written or displayed so that its meaning can be easily understood by the persons affected by the rule.

Consistency: PAR 1110.2 is in harmony with, and not in conflict with or contradictory to, existing federal or state statutes, court decisions or federal regulations.

Non-Duplication: PAR 1110.2 does not impose the same requirement as any existing state or federal regulation, and is necessary and proper to execute the powers and duties granted to, and imposed upon the AQMD.

Reference: In amending this rule, the following statutes which the AQMD hereby implements, interprets or makes specific are referenced: Health and Safety Code sections 39002, 40001, 40702, 40440(a), and 40725 through 40728.5.

COMPARATIVE ANALYSIS

Under Health and Safety Code Section 40727.2, the AQMD is required to perform a comparative written analysis when adopting, amending, or repealing a rule or regulation. The comparative analysis is relative to existing federal requirements, existing or proposed AQMD rules and air pollution control requirements and guidelines that are applicable to industrial, institutional, and commercial combustion equipment. A comparative analysis is not required if the District finds that the proposed rule does not impose a new emission limit or standard. The District makes that finding, since the 2012 limits are already existing and the proposed rule does not make it more stringent. Nevertheless, the District

incorporates by reference the comparative analysis contained in the February 2008 Final Staff Report for PAR 1110.2, which is also updated below for changes.

National Emissions Standards for Hazardous Air Pollutants and New Source Performance Standards

Appendix F in the 2008 Final Staff Report for Proposed Amended Rule 1110.2 (February 2008) provides a detailed summary and comparison of the key elements of PAR 1110.2, the RICE NESHAP, and the NSPS. Appendix F is incorporated in this report by reference and is available at http://www.aqmd.gov/hb/2008/February/080233a.html. The proposed amendments of PAR 1110.2 are not in conflict with federal regulations.

AQMD Rules Applying to Stationary Gaseous- and Liquid-Fueled Engines

AQMD Rule 218 and 218.1 - Continuous Emission Monitoring Rules, which were amended on May 14, 1999, and May 4, 2012, respectively, set forth requirements for new, modified and existing continuous emission monitoring systems that include certification, development and implementation of a Quality Assurance/Quality Control Plan, recordkeeping, reporting, and performance specifications. PAR 1110.2 requires ICEs with required CEMS to comply with Rule 218 and 218.1.

AQMD Rule 401 – Visible Emissions, which was last amended on November 9, 2001, prohibits the discharge of emissions into the atmosphere from any single source for period or periods aggregating more than three minutes in any one hour which will cause: a dark or darker shade as that of a number 1 on the Ringelmann chart, as published by the United States Bureau of Mines, or of an opacity equal or greater than number 1 on the Ringelmann chart.

AQMD Rule 431.1 – Sulfur Content of Gaseous Fuels, which was last amended on June 12, 1998, prohibits the sale and use natural gas with a sulfur content exceeding 16 ppm. Rule 431.1 also prohibits the sale and use of the following gases with a sulfur content exceeding: 150 ppmv in landfill gas; 40 ppmv in refinery gas, sewage digester gas and other gases.

AQMD Rule 431.2 – Sulfur Content of Liquid Fuels, which was last amended on September 15, 2000, prohibits the purchase by stationary source end users of any diesel fuel with a sulfur content exceeding 15 ppm on and after June 1, 2004.

AQMD Rule 1303 - New Source Review Requirements, which was last amended on December 6, 2002, requires BACT, modeling and emission offsets for any new or modified source which results in an emission increase of any nonattainment air contaminant, ozone depleting compound or ammonia.

AQMD Rule 1401 - New Source Review of Toxic Air Contaminants, which was last amended on September 10, 2010, specifies limits for maximum individual cancer risk (MICR), cancer burden, and non-cancer acute and chronic hazard index (HI) from new, modified and existing permitted sources which emit toxic air contaminants (TACs) listed in Table I of Rule 1401. Although numerous TACs may be emitted from engines,

formaldehyde, acrolein, methanol, and acetaldehyde account for essentially all of the mass emissions. PAR 1110.2 target pollutants are NOx, VOC and CO.

AQMD Rule 1470 - Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines, which was amended on May 4, 2012, addresses primarily toxic diesel PM from new and existing, stationary, emergency and non-emergency, diesel engines, whereas Rule 1110.2 addresses only NOx, VOC and CO emissions.

AQMD Regulation XX - Regional Clean Air Incentive Market (RECLAIM) superseded many Regulation IV and Regulation XI rules for NOx and SOx for the largest facilities with an emission trading program that achieved equivalent emission reductions, but in a way to allow facilities flexibility in achieving emission reduction requirements for NOx and SOx by methods such as add-on controls, equipment modifications, reformulated products, operational changes, shutdowns, and the purchase of excess emission reductions. Facilities for which emission fee data for 1990 or subsequent year shows four or more tons per year of NOx or SOx, excluding certain exempt sources, are subject to this program. Regulation XX specifically identifies requirements for ICEs, in addition to other specific sources, which include monitoring, reporting and recordkeeping for NOx and SOx emissions. PAR 1110.2 would apply to VOC and CO emissions from IC Engines from these sources.

While only applicable to new electrical generating engines, the CARB 2007 Distributed Generation Regulation is discussed below.

CARB 2007 Distributed Generation Regulation

Beginning in 2007 CARB required new Distributed Generation (DG) units sold in the state to be certified by meeting emission standards that are at least equivalent or more stringent than those for large central power generating stations with BACT. The emission standards are applicable unless engines are not exempt from any District requirements. In addition, the regulation calls for currently permitted equipment to meet the more stringent emission standard by the earliest practicable date. Biogas fueled ICEs subject to the CARB regulation installed after January1, 2013 must meet the emission standards of large central power generating stations with BACT.